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Tamper resistant screw closure for bottle - has band with inwards facing container-engaging projections linked to cap via frangible links

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The tamper-resistant screw closure for a bottle (9) has a screw threaded cap (2) with a top and a depending skirt (5). A tamper resistant band (3) below the skirt has multiple spaced frangible tongues (4) connecting it to the cap. The band has internal projections (23) which engage below the externally projecting flange (13) on the bottle neck.

The projections resist upward movement of the band, so that unscrewing of the cap results in breakage of the frangible tongues, indicating opening has occured. The band and cap can be connected by ratchet teeth (20,21) during fitment initially onto the bottle, these then separating to allow operation as a tamper indicator. (14pp Dwg.No.3/4)

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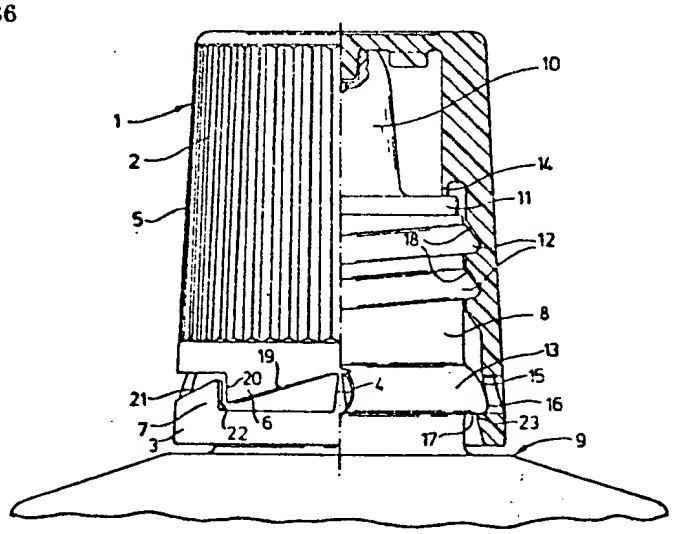

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(54) Tamper-resistant screw closure.

(57) A tamper-resistant screw closure for a bottle (9) or the like having an external screw thread (12) in which a cap (2) with a top and a depending skirt (5) and a tamper-resistant band (3) below the skirt has spaced apart frangible tongues (4) connecting with the skirt and the tamper-resistant band and the tamper-resistant band has internal projections (23) engaging below the external projecting means (13) on the bottle to resist movement of the band when the closure is unscrewed so that the frangible tongues break to show that the closure has been removed.

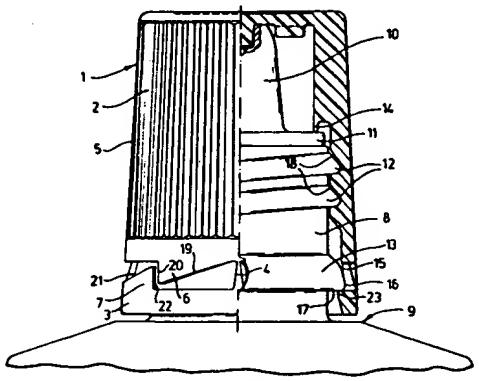

Fig.3.

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The references to the drawings 5 and 6 are deleted

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TAMPER-RESISTANT SCREW CLOSURE

This invention relates to the provision of a tamper-resistant screw closure for use with an associated container of the type having a body to hold the contents of the container, a mouth through which the contents can be dispensed, an external screw thread adjacent to the mouth and external projecting means below the screw thread and in this specification a container of this type is referred to as a substantially normal container which may be, for example, a bottle for holding pills or tablets.

There is a demand for a tamper-resistant screw closure of relatively simple design capable of being used with a substantially normal container. There have, in fact, been many previous proposals for the provision of tamper-resistant screw closures for co-operation with specially shaped bottles, for example using co-operating ratchet and pawl mechanism, one co-operating part being on the closure and the other part being on the bottle. These have been satisfactory in operation but have been expensive to produce due to the requirement for the provision of a special bottle. It is an object of the present invention to provide a tamper-resistant screw closure for use with a substantially normal container e.g. a bottle. According to the present invention, in its broadest aspect, there is provided a tamper resistant screw closure for application to a container of the type described in order to close the mouth of the container wherein the closure comprises (a) a cap part with a top and a depending skirt and (b) a tamper-resistant band below the skirt characterised in that the tamper-resistant band is connected to the skirt of the cap part of the closure by a plurality of spaced apart frangible tongues and that the tamper-resistant band is provided with internal projecting means adapted and positioned to engage below the external projecting means on the container to resist

upward movement of the tamper-resistant band when the closure is unscrewed so that the frangible tongues break and show that the closure has been removed. Preferably the internal projecting means on the closure and the external projecting means on the container are in the form of annular rings shaped so that they will readily engage when the closure is screwed on to the container but will resist disengagement when the closure is unscrewed.

If desired, the bottom of the skirt of the cap part of the closure and the top of the tamper-resistant band may have cooperating ratchet teeth or serrations to facilitate operation of the closure. The invention therefore includes a tamper-resistant screw closure for application to a container of the type described in order to close the mouth thereof wherein the closure comprises (a) a cap part with a top and a depending skirt and (b) a tamper-resistant band below the skirt characterised in that the tamper-resistant band is connected to the bottom of the skirt by a plurality of frangible connecting tongues and that the tamper-resistant band is provided with internal projecting means to engage with external projecting means on the container to resist upward movement of the tamper-resistant band when the closure is unscrewed and further characterised in that the bottom of the skirt of the cap part has ratchet teeth for engagement with co-operating ratchet teeth on the top of the tamper-resistant band in such a way that when the closure is screwed on to a container the ratchet teeth engage and the band turns with the cap part but when the closure is unscrewed the teeth on the cap part move out of engagement with the teeth on the band and the frangible tongues are broken.

In order that the invention may be more clearly understood, reference is now directed to the accompanying drawings given by way of example in which:-

Figure 1 is a sectional view of one embodiment of the invention;

Figure 2 is a detail view of a modification;

Figure 3 is a sectional view of a second embodiment and

Figure 4 is a side elevation of the embodiment shown in Figure 1 drawn to a smaller scale.

Referring first to Figure 1 a closure 1 comprises a cap part 2 and a tamper-resistant band 3 connected to the cap part 2 by frangible tongues 4. The cap part 2 has a skirt 5 and a depending annular sealing projection 14 to rest on a part of a container and an internal screw thread 18 for cooperation with a screw thread on the container. The tamper resistant band has an internal bulbous annular bead 23 for cooperation with an external bead on a container, not shown in Figure 1. The operation of the closure will be described after referring to the other Figures.

Figure 2 differs from Figure 1 only in that the bottom of the skirt 5 of the cap part has serrations or teeth 6 for co-operation with serrations or teeth 7 on the top of the band 3.

Referring now to Figure 3 a closure 1 comprises a cap part 2 and a tamper-resistant band 3 connected to the cap part 2 by frangible tongues 4. The bottom edge of the skirt 5 of the cap part 2 has ratchet teeth 6 projecting downwardly for co-operation with ratchet teeth 7 projecting upwardly from the band 3. Figure 3 shows the closure 1 in position on the neck 8 of a bottle 9. The bottle 9 is of substantially normal shape, that is to say that it is more or less one of a number of standard designs of bottle that can readily be obtained from bottle manufacturers. The bottle 9 is shown with a top attachment 10 of reduced diameter specially adapted for pouring or for use as a dropper.

The bottle itself has an annular flange 11, a screw thread 12 and an annular retaining bead 13. The attachment and the inside surface of the top of the cap part 2 of the closure 1 may be shaped as shown in Figure 3 but form no part of the present invention. The flange 11 is substantially flat at the top around the mouth of the bottle to receive a depending annular sealing projection 14 on the closure 1. The bead 13 is nose shaped in section and slopes gently downwardly and outwardly on its upper surface 15 with a rounded end 16 and a substantially horizontal lower surface 17.

The closure is shaped internally as shown in Figure 3 and includes the projection 14, a screw thread 18 for co-operation with the screw thread 12 and the ratchet teeth 6 each of which has a sloping trailing edge 19 and a substantially vertical leading edge 20. The band 3 includes the ratchet teeth 7 each of which has a sloping leading edge 21 and a substantially vertical trailing edge 22. The band also has an internal annular bulbous bead 23 for co-operation with the bead 13.

In operation when the closure 1 is applied to a container e.g. the bottle 9 the thread on the closure engages with the thread on the bottle and as the closure is moved downwardly, turning on its vertical axis as it does so, the vertical leading edges 20 on the teeth 6 engage with the vertical trailing

edges 22 on the teeth 7 so that the movement of the cap part 2 drives the band 3 around with it and the nibs 4 remain unbroken. The closure reaches its operative position when the bead 23 has passed over the bead 13 into the position shown in Figure 2. It will be understood that the closure is made of suitably flexible and resilient material e.g. a plastics material such as polypropylene, so that on the downward movement of the closure the band 3 will be deformed and the bead 23 will slide over the bead 13. The bead 23 on the band will return to its normal position after the bead 23 has passed below the bead 13. When in this position as shown in Figure 2 the band 3 is connected to the cap part 2 by the tongues 4 and if on inspection it is noted that the tongues 4 are intact then that fact indicates that the container and its contents have not been tampered with.

When it is desired to open the container the closure is turned in a direction to unscrew it by manipulation of the cap part 2 so that the closure tends to rise in Figure 3 which causes the edges 20 to move away from the edges 22 with the sloping edges 19 sliding on the sloping edges 21. This movement exerts an upward pull on the tongues 4 which try to pull the band 3 upwardly with the cap part. However the engagement of the bead 23 below the bead 13 prevents the band 3 rising so that the tongues break and the cap part can be

removed leaving the band stranded on the container in the manner of a collar.

Therefore, if it be observed by a user that the tongues have been broken that is evidence that the closure and possibly the contents of the container have been tampered with.

As described above manipulation of the closure 1 is effected, in accordance with normal practice, by gripping and turning the closure and naturally a user will grip the cap part which is therefore preferably roughened or serrated as shown, on its outer surface to facilitate manipulation.

It will be appreciated that the precise number of the teeth 6 and 7 provided is not critical but the provision of four equispaced pairs of teeth i.e. drive-on ratchets and four equispaced tongues4is a convenient arrangement and is as illustrated in the drawings.

We have referred above to the bottle as being substantially of normal or standard shape. We have used the word substantially in this connection because it may be necessary in some cases to modify the normal shape of the bead 13 to provide an effective sealing on the underside for the bead 23 so that the bead 23 cannot slip over the bead 13 in an upward direction. However modification of the bead 13 is a relatively simple and inexpensive operation compared with the

The references to the drawings 5 and 6 are deleted

provision of special teeth or the like on the bottle neck.

We should make clear that the use of the attachment 10 is not significant and it is included simply as an Example. The cap may certainly be used with a bottle without the attachment. In the embodiment illustrated the cap has a plug which fits into a central opening in the attachment for sealing purposes.

Figures 3 and 4 ~~and 5 and 6~~ show two further embodiments of the invention in which the same references are used as in Figures 1 and 2 for the same parts.

The operation of the embodiments described in connection with Figures 1, 2 and 4 is similar to the operation of the embodiment of Figure 3 except that the ratchet teeth cooperation is not used. In the embodiment of Figures 1 and 4, the engagement of the bead 23 with the bead 13 is sufficiently positive to prevent the band 3 from rising when the closure is unscrewed. In the embodiment of Figure 2 the teeth 6 and 7 are provided as an additional safeguard; the teeth will tend to engage as the closure 1 is screwed on to the bottle and will tend to disengage as the closure is unscrewed. This means that the teeth 6 on the skirt will tend to drive the band round with the cap part as the closure is screwed on but the teeth 6 and 7 will tend to disengage as the closure is unscrewed, the band will be left behind and the tongues will break.

In Figures 1 and 2 the tongues 4 are shown as bow-shaped in side view to allow a certain amount of "play"

when screwing a closure on to a container, just in case there is a little relative movement between the cap part and the skirt especially in the Figure 1 embodiment. It will be realised that unwanted movement of one part of the closure relatively to the other screwing on the cap could lead to breaking of the tongues which would give an incorrect indication that the container had been tampered with.

CLAIMS:

1. A tamper-resistant screw closure for application to a container of the type described in order to close the mouth thereof wherein the closure comprises (a) a cap part with a top and a depending skirt and (b) a tamper resistant band below the skirt characterised in that the tamper-resistant band is connected to the skirt of the cap part of the closure by a plurality of spaced apart frangible tongues and that the tamper-resistant band is provided with internal projecting means adapted and positioned to engage below the external projecting means on the container to resist upward movement of the tamper-resistant band when the screw closure is unscrewed.

2. A tamper-resistant screw closure for application to a container of the type described in order to close the mouth thereof wherein the closure comprises (a) a cap part with a top and a depending skirt and (b) a tamper-resistant band below the skirt characterised in that the tamper-resistant band is connected to the bottom of the skirt by a plurality of frangible connecting tongues and that the tamper-resistant band is provided with internal projecting means to engage with external projecting means on the container to resist upward movement of the tamper-resistant band when the closure is unscrewed and further characterised in that the bottom of the skirt of the cap part has ratchet teeth for engagement with cooperating ratchet teeth on the top of the tamper-resistant band in such a way that when the closure is screwed on to a container the ratchet teeth engage and the band turns with the cap part but when the closure is unscrewed the teeth on the cap part move out of engagement with the teeth on the band and the frangible

tongues are broken.

3. A tamper-resistant screw closure according to claim 1 characterised in that the lower edge of the skirt of the cap part and the upper edge of the band are serrated or have teeth.

4. A tamper-resistant screw closure according to any of claims 1 to 3 characterised in that the tongues are of bow shape.

5. A tamper-resistant screw closure according to any of the preceding claims characterised in that the internal projecting means on the cap part and the external projecting means on the container are in the form of annular rings.

6. A tamper-resistant screw closure according to claim 5 characterised in thatthe annular ring on the band is bulbous in shape.

7. A tamper-resistant screw closure according to claim 5 or 6 characterised in that the annular ring on the container is nose shaped in section in that it slopes gently downwardly on its upper surface and has a substantially horizontal lower surface.

8. A tamper-resistant screw closure according to any of the preceding claims in combination with a substantially normal container.

9. A tamper-resistant screw closure substantially as hereinbefore described with reference to any of the embodiments illustrated in the accompanying drawings.

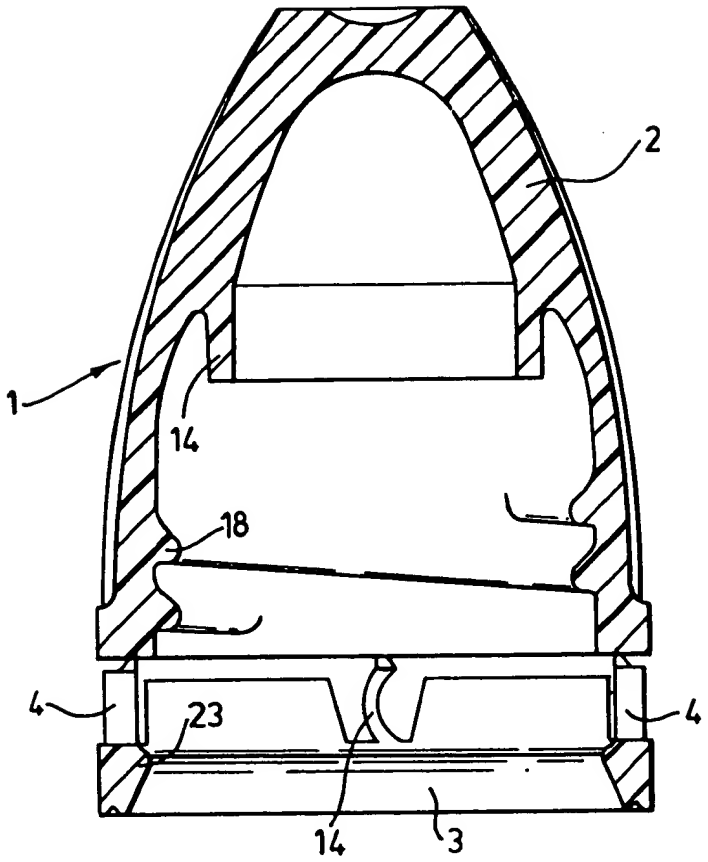

Fig.1.

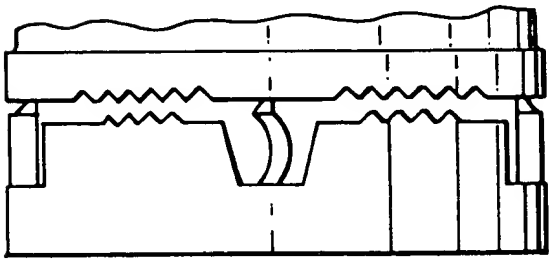

Fig.2.

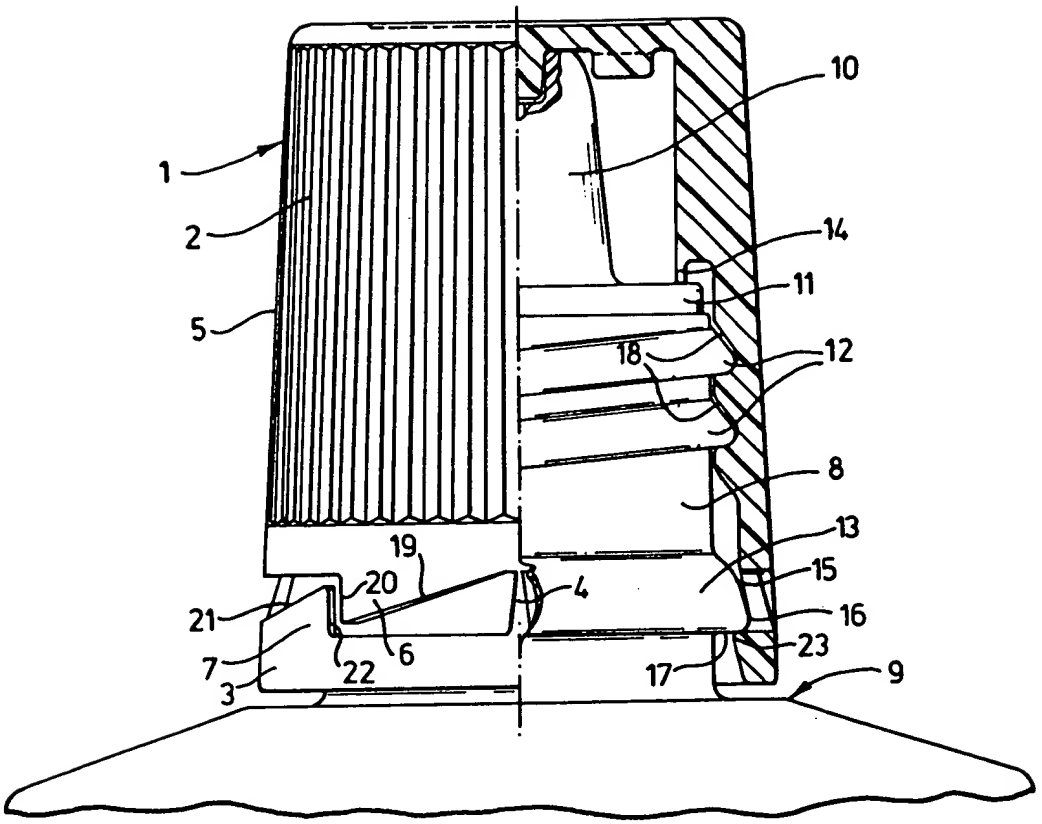

Fig.3.

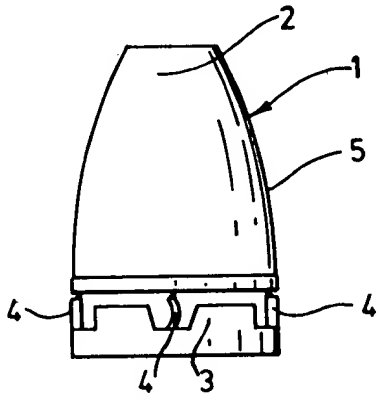

Fig.4.

European Patent Office

0080846

Application number

EP 82 30 6203

EUROPEAN SEARCH REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X	FR-A-1 536 459 (RAPEAUD et al.) *The whole document*	1,2,3, 5,8,9	B 65 D 41/34
Y		4	
Y	FR-A-2 298 255 (PERNE et al.) *Figure 7*	4	
X	FR-A-1 581 775 (ALBACO S.A.). *Figures 1-4*	1-3,5-9	

TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
B 65 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	07-03-1983	ARGENTINI A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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E : earlier patent document, but published on, or after the filing date
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